GEOGRAPHICAL RECORD

NORTH AMERICA

Temperature Influence on Dates of Planting and of Harvesting in the United States. The detailed investigation of the influence of weather controls over agricultural operations in the United States is yielding valuable results of immediate practical economic importance to American farmers. A recent study, by Joseph B. Kincer, of the U. S. Weather Bureau, entitled "Temperature Influence on Planting and Harvest Dates" (*Monthly Weather Rev.*, Vol. 47, 1919, pp. 312-323), adds another interesting chapter to this subject.

There are naturally certain restricted time limits within which crops should be planted in order to secure the best results, these limits being defined by the temperature conditions of the locality. The length of the period within which the planting of a given crop may be accomplished decreases in general with increase in latitude. As a rough measure of the amount of heat required after planting to bring a crop to maturity, the accumulated day-degrees of temperature above the mean temperature at which planting is accomplished may be taken. It is suggested that the mean temperature at which the planting of a given crop can be accomplished be used as a base, or starting point, for any method that may be employed for temperature summation. Spring wheat seeding usually begins in the Dakotas and in Nebraska when the normal daily temperature rises to 37° F. and in Minnesota and Wisconsin when 40° is reached. The seeding of spring oats usually begins when the normal daily temperature rises to 43°, corresponding to the advent of the vegetative period. Early potato planting begins as a rule when the normal daily temperature rises to 45° and corn when 55° is reached. The dates on which the latter is reached correspond closely to the average dates of last killing frost in spring. Cotton planting usually does not begin until the normal daily temperature rises to about 62°. The dates on which this temperature is reached correspond closely to the latest dates in spring on which killing frost has occurred.

Cotton and corn are warm-weather crops, and the areas in which successful production on a commercial scale can be accomplished are limited principally by both the general temperature conditions and the temperature at which planting may be accomplished. Owing to the relatively large thermal requirements of corn and cotton, a comparatively warm spring is necessary for best results of germination and early growth.

Mr. Kincer's paper is illustrated by means of several charts showing the average dates on which the critical temperatures required for planting the various crops occur and by diagrams showing the accumulated temperatures for various sections and months.

In connection with this same subject, reference may here be made to a recent study by O. E. Baker, C. F. Brooks, and R. G. Hainsworth ("A Graphic Summary of Seasonal Work on Farm Crops," *U. S. Dept. of Agric. Yearbook for 1917*, pp. 537-589; abstracted in *Monthly Weather Rev.*, Vol. 47, 1919, pp. 323-327). Maps are given which show the dates when planting, harvesting, and other operations are performed in the culture of the staple crops in different parts of the United States. The seasonal distribution of labor by ten-day periods on typical farms in several important agricultural regions is shown by graphs. Information is also given as to the hours of labor per acre required in growing the staple crops in various sections of the country. R. DEC. WARD

Recent Explorations on the Isthmus of Panama. Though for four centuries the Isthmus of Panama has been the international crossing-place between two oceans, a large part of its territory is still almost unknown. In the March, 1919, number (pp. 309-321) of *Natural History* (formerly the *American Museum Journal*) there appears an account of recent explorations which were undertaken by an American army officer in the region between the city of Colón and the ancient harbor of Nombre de Dios and extending from the coast to the headwaters of the Chagres River system. This district, whose western end is almost within sight from the Canal Zone, is an uninhabited wilderness. Lieutenant Colonel Townsend Whelen, author of the article, says that throughout this district not a trace of human inhabitants was found. There are no roads, no trails, not even navigable streams. A luxuriant tropical forest covers the rough, hilly country. Through this, in some places, particularly on the border of the Canal Zone, where a dense second growth has occupied the land once cleared, passage had to be cut with machetes. Into such country it was found impracticable to lead the two companies of infantry that were

assigned to this task of exploration. Consequently, from a base-camp established near the eastern extremity of Gatun Lake, small parties consisting of four or five in a group went farther into the forests, remaining from a few days to a month's time according to the supply of food that could be carried or could be obtained in the regions explored. As the expedition was chiefly military and merely aimed at a preliminary exploration in preparation for a later thorough survey and mapping of the region, the scientific results obtained were necessarily meager.

Colonel Whelen, however, records some interesting observations regarding the country traversed. He discovered that the Río Grande, generally supposed to be one of the largest rivers along that section of the coast, is a short and very insignificant stream, while the Río Piedras, though it appears on few maps, is in reality one of the largest watercourses on the isthmus. He also believes that some of the mountains seen by him had never before been sighted.

This region, however, was better known in the early colonial days than at present. Roads existed across it in places, some mines were worked, and small settlements were made in what is now an uninhabited district. The old paved road leading from Panama to Nombre de Dios and Porto Bello, long the principal interoceanic route, led across near Mount Sáximo which Colonel Whelen saw. But with the passing of the Spanish galleons and the increasing use of the route around Cape Horn, these roads were abandoned, the settlements deserted, and the tropical forest regained supremacy. About the middle of last century, when surveys were being made for the Panama Railroad, engineers explored a part of this country, and their map (Map of the Isthmus of Panama representing the line of the Panama Rail Road as constructed under the direction of George M. Totten, Chief Engineer, etc., reduced and compiled from the original surveys by Thos. Harrison, Crown Surveyor, 1:96,000, Jamaica, 1857) is still probably the most detailed as well as the most accurate that has been published.

The Rainfall of Panama. H. G. Cornthwaite, Chief Hydrographer in the Panama Canal Zone, discusses the rainfall of Panama in a recent number of the *Monthly Weather Review* (Vol. 47, 1919, pp. 298-302). Most of the rainfall is of convectional origin, of the afternoon thundershower type. There is a dry season of about four months (January to April) and a rainy season of eight months. The rainfall is heaviest along the Atlantic coast and in sections of the upper Chagres drainage basin and diminishes gradually towards the Pacific coast. The heaviest annual rainfall at any station on the isthmus is approximately 170 inches, at Porto Bello, on the Atlantic coast. In the year 1909, 237.28 inches fell there, constituting a "record" for any station on the isthmus. A very favorable characteristic is the small annual variability of the rainfall, for this condition ensures a dependable water supply for the operation of the canal.

During the "dry season" the rains usually come in light local showers, but heavier general rains occasionally occur along the Atlantic coast in connection with "northers." The hour of heaviest rainfall is, as a rule, from 2 to 3 P. M. Along the Atlantic coast nearly half of the total rainfall comes at night, this being the result of a smaller percentage of afternoon thundershowers and a larger percentage of general nocturnal rains than occur elsewhere on the isthmus. In November and December general rainstorms, often accompanying storms of the "norther" type, may occur, occasionally lasting 24 hours or longer and some of them extending over the entire Canal Zone and adjacent territory. One of the largest freshets in the history of the Chagres River occurred on December 2-3, 1906, in a very heavy general rainstorm accompanying a severe "norther." The maximum 24-hour rainfall on the isthmus, so far recorded, is approximately 11 inches. This has been exceeded at several stations in the United States. R. DEC. WARD

EUROPE

Constantinople and the Straits. From the Trojan War to the Gallipoli campaign the straits connecting the Black Sea and the Mediterranean have possessed a unique strategic importance. According to the deductions of Leaf, Homeric Troy was in reality a great commercial center because of its command of the Black Sea route (W. R. Kermack: Notes on the Historical Geography of the Dardanelles, *Scottish Geogr. Mag.*, July, 1919). The narrow straits present difficulties to sailing vessels. A strong current sets from the Black Sea to the Mediterranean—a circumstance, it might incidentally be noted, that, through the agency of floating mines, proved a valuable help to Turkish defence in the late war. The channel is narrow and winding and during the winter is apt to be swept for days together by the dreaded Etesian wind. With tide and wind against them, sailing ships would be held up at the entrance to the straits, where furthermore Troy controlled the only sources of fresh water supply. The Trojan War is thus resolved into an early struggle for freedom of navigation.

With the fall of Troy trade between the Greek cities and the Black Sea entered on a prosperous epoch. The site of Troy, however, was not possessed of other advantages. The situation at the northern end of the straits is intrinsically far superior. Here is the great crossing point of the north-to-south seaway with the land road running from the Danube via the Maritza valley to Adrianople, crossing the Bosporus and proceeding by the Sakaria valley to the heart of Anatolia—the route of the Berlin-Bagdad railroad. Constantinople commands this crossing point. As soon as Trajan and his successors brought civilization to the Balkans and the Danube, Constantinople arose to capital importance.

Constantinople is exceptionally favored not only as regards situation but also as regards site. The "incomparable" natural port is as adequate to the enormous ships of today as to the modest vessels of Phoenicia and ancient Greece. From the entrance to the Bosporus the harmonious curve of the Golden Horn swings northwest for four miles, embracing a deep-water area with good anchorage (Paul Masson: Constantinople et les détroits, *Ann. de Géogr.*, March 15, 1919).

Under Byzantine rule Constantinople figured as the chief trading center of the world, a Paris and a London in one. Under Turkish rule, and especially in the last century, the city has declined in relative importance. Today the commercial movement of the port is exceeded even in the Mediterranean by Marseilles, Naples, Algiers, and Genoa. In part decline is due to miserable economic conditions in the Turkish Empire; among other things Constantinople is entirely lacking in modern port works and facilities. In part decline is due to a loss of the centralized control over roads and markets. The later eighteenth century saw the opening of freedom of navigation to the Black Sea. Constantinople also lost as a center of affairs. Improvement of communications in Anatolia, for instance, led to direct trade with local centers instead of through the great entrepôt.

Of the exact position of Constantinople as a port it is somewhat difficult to form an estimate; statistics are incomplete and otherwise inadequate. There has been a tendency toward gross exaggeration of the port movement through inclusion in statistics of ships passing in transit through the Bosporus. While the trade of Constantinople has relatively declined, that of the straits has been greatly augmented. In character this is distinctly different from that of the great port. Constantinople is a passenger port, a port for merchandise de luxe and the parcel post. The city, which lives in part on its momentum from the past, supports a large population—1,200,000—and perforce has a large import trade. Six-sevenths of the total trade is thus accounted for. Smyrna exceeds Constantinople in the value of exports. Freighters, especially, constitute the movement through the straits. A great proportion of the vessels are British, carrying coal outward and returning with grain from the Black Sea ports. At Constantinople, excluding the large coastal trade, France leads with a service of several regular liners.

Whatever the future, Constantinople must retain the nodal value of its situation, but there are indications of certain changes in the relative strengths of the converging movements. As an outlet for the Balkans it seems that the activity of the city must be more and more restrained. With railroad development there is also the rise of national ports. Kavala and Saloniki take their places besides Constantza, Burgas, and Varna. On the contrary there must be a gain on the Asiatic side as the agricultural and mineral wealth of Anatolia is made available. Constantinople will recover with interest the trade lost in the seventeenth century through the decline of the caravan routes. West and north are the great cereal lands of Bulgaria, Rumania, the Ukraine, of a productivity now comparatively low and now supporting a comparatively small population. Still more is the economic future before the lands farther east. The north-to-south commercial movement through the straits must be enormously increased, and it is especially on this movement that Constantinople must rely for the rebuilding of her ancient prosperity.

The Rainfall of the British Isles in 1918. According to a preliminary report on the rainfall of the British Isles in 1918 issued by the British Rainfall Organization (*London Times,* January 20, 1919, and *Symons's Meteorol. Mag.*, Jan., 1919, pp. 131-132) the past year was marked by an unusual amount of rain in each of the five major divisions of the islands. Wales showed an excess of 13 per cent above the average, Ireland 11 per cent, North England 10 per cent, Scotland 6 per cent, and South England 5 per cent. The excess for the United Kingdom as a whole was 9 per cent. This is a decided contrast to the rainfall of the preceding year, which showed 3 per cent less than the average. In fact, Dr. H. R. Mill, the director of the organization, had already called attention to the series of alternating fat and lean years that has been running since 1910 and had forecast as probable a heavier precipitation for 1918.

If the islands are divided into regions on the basis of their average precipitation, instead of along political boundaries or according to latitude, we find that the usually dry region of eastern Scotland and east-central England enjoyed no greater moisture,

but rather suffered, during 1918, a decided deficiency, amounting in some cases to 18 per cent. On the other hand, the great excess of the year was in the wet regions of the west, where it reached as much as 20 and even 30 per cent along the coast of Wales, Ireland, and Scotland. Thus the wet districts were wetter and the dry districts drier than in normal years.

Comparing the data and maps for 1917 with those of last year (see Hugh Robert Mill and Carle Salter: On the Distribution of Rain in Space and Time over the British Isles During the Year 1917, London, 1918; reviewed in *Geogr. Rev.*, Vol. 7, 1919, pp. 354-355) we find that, in general, the same condition held true, viz. the drier sections showed a deficiency and the wetter sections an excess, though over the islands as a whole the year ranked as a dry one, there being only 97 per cent of the usual rainfall. This would seem to indicate an intensifying of the control or controls responsible for the regional difference in precipitation, or, perhaps, a diminution of the forces which tend to interfere with those controls. Though no record of wind directions for the year is as yet available, the distribution above noted would appear to indicate an unusual prevalence or effectiveness of the rain-bearing southwesterlies. These rains water the western shores and the highlands but bring little precipitation to the eastern sections. The latter, depending for their rain upon easterly and northeasterly winds during the interruption of the southwesterlies, fare badly when this interruption does not take place.

A notable feature of the year's rainfall was the unusually wet September, when over most of the United Kingdom there was an excess of more than 100 per cent. This was especially marked in the southern part of England. At London it was the wettest September in the long record of 61 years, 25 days during the month being marked as rainy. This month does not stand alone, however, for during the year seven months show more rainy days than the average year and six months had heavier rainfall than is usual. There was a total of 195 rainy days in London, the average being 163.

PHYSICAL GEOGRAPHY

Does the Moon Cause a Tide in the Air? Dr. S. Chapman has supplemented the earlier work of Laplace and Airy on the lunar atmospheric tide by analyzing the observations made at Batavia and Hongkong together with the records of Greenwich in order to determine the influence of latitude (S. Chapman: The Lunar Atmospheric Tide at Greenwich, 1854-1917, *Quart. Journ. Royal Meteorol. Soc.*, Oct., 1918; idem: The Lunar Tide in the Atmosphere, *Nature*, May 8, 1919). These observations were derived from the registers of a barometer whose readings are taken to 0.001 inch of barometric pressure; and the scale of the photographic register multiplies this by four. The analysis was facilitated by the use of "quiet" days so as to eliminate, as far as possible, the irregular pressure changes, due to various causes, that are characteristic of the atmosphere especially in high latitudes. The extent of the computation was very great, but the results fully justify the necessary expenditure of time and funds.

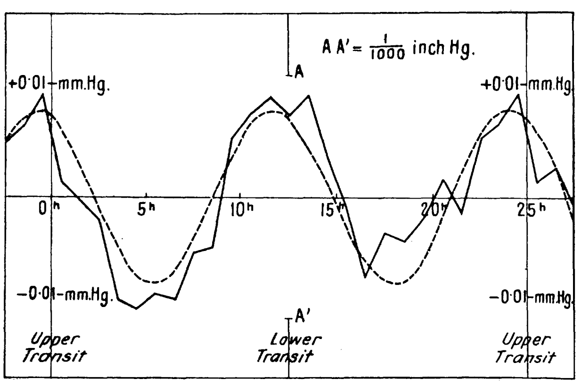

FIG. 1—The lunar semi-diurnal tide in the atmosphere at Greenwich, as determined from the Greenwich records of barometric pressure, 1854-1917. (Copied from a figure in the articles cited in the text.)

The inner two vertical lines mark out a complete lunar day, on either side of which a small portion of the curve is repeated.

The work demonstrated a lunar tide appreciably less than one-thousandth of an inch (AA′ in Fig. 1). The unbroken line of the figure shows the mean lunar hourly inequality of pressure; the broken line is its semidiurnal component. "The accordance between the two graphs shows in a striking manner how effectively this extremely small lunar tidal variation in the atmosphere has been disentangled from the solar and irregular fluctuations of barometric pressure."

GEOGRAPHICAL NEWS

French Geographical Appointments in Alsace-Lorraine. In connection with the reorganization of the administration of Alsace-Lorraine incident on the reversion of the two "lost provinces" to France, several scientific appointments of geographical interest are announced. M. Emmanuel de Margerie, the well-known geographer and geologist, has been appointed Director of the Geological Survey of Alsace-Lorraine. Geography will be represented by two chairs at the University of Strasbourg, one occupied by Professor Henri Baulig, recently of the University of Rennes, the other by Pierre Denis, the well-known specialist on South American geography.

PERSONAL

MR. VERNON BAILEY of the U. S. Biological Survey addressed the Biological Society of Washington on May 3 on "The Explorations of Maximilian, Prince of Wied, on the Upper Missouri in 1833." Dr. Bailey described the travels of this early naturalist and discussed his zoögeographical observations.

PROFESSOR HOWARD E. SIMPSON, associate professor of geology and physiography at the University of North Dakota, has been promoted to a professorship of geographic geology at the same institution. Professor Simpson was a member of the American Geographical Society's Transcontinental Excursion of 1912.

PROFESSOR J. RUSSELL SMITH, lately of the University of Pennsylvania, has been appointed Professor of Economic Geography at Columbia University. Professor Smith will give courses in the College, the School of Business, and the Graduate School. His courses will deal with general economic geography, the economic geography of Europe, Latin America, Asia, and Africa and Australia, and with the influence of geographical environment on human affairs.

DR. T. WAYLAND VAUGHAN of the U. S. Geological Survey returned to Washington in the late summer after spending several months in a geologic reconnaissance of the Dominican Republic for the Dominican Government. Dr. Vaughan also visited Port-au-Prince, Haiti, and made arrangements with the Haitian Government for a preliminary geological survey of Haiti.